

WILDFIRE

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When Prompted



Captain Gary Cummings

WILDFIRE



- **Montgomery County encompasses an area of approximately 325,000 acres.**
- **Over 93,000 is parkland. Farms and other private woods are not included.**



March 14, 2018

A large portion of the county has vegetation that would be considered fuel for a “brush fire”

This training is going to introduce the make-up of a wildfire and a give you a framework to keep our crews and the public safe as we mitigate what is commonly called wildland fires.

WILDFIRE



- As a county we have had a few larger wildland fires, most notably the Darnestown Complex on February 11, 2011 which burned approximately 500 acres and damaged or destroyed numerous buildings. This fire severely taxed MCFRS resources.



WILDFIRE TRAINING

While these larger fires are maybe a once in a career occurrence, the trend nationally is for more wildfires with more acres burned, more structures destroyed and more civilian fatalities.

Fires in October and November 2016 burned over 90,000 acres in Georgia, Tennessee, North Carolina. 24 people died, over 2,400 structures damaged. The Rough Ridge fire in Georgia grew to 28,000 acres.

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Large (>30acre) Laytonsville area BRUSH/WOODS FIRE, utilizing at least 10 engines, 8 water tankers, 12 brush trucks, MSP Helicopter



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As you can see, a small area can take a lot of resources.

WILDFIRE



- **Wildfire Season
September-April**
- **Usually Multiple Starts**



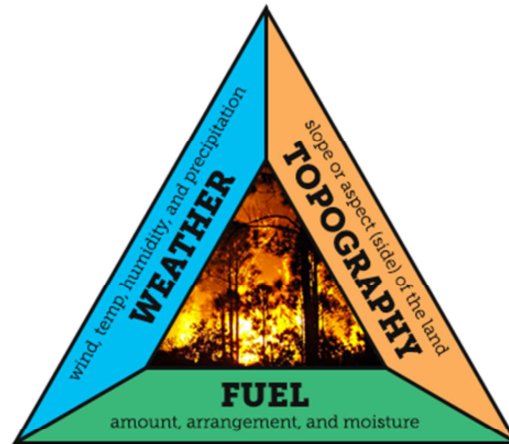
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Usually, Montgomery County gets busy with brush fires during specific time periods. Looking at our climate and vegetation we typically run wildfires from September to April. Once green up occurs our chances go down.

Drought can alter this in the summer months - May to August dependent on drought conditions.

WILDFIRE



Fire Behavior Triangle

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Fuel, weather and topography make up the wildland fire triangle. When the conditions are right between the three fire activity increases. When fighting wildfires we take away fuel by cooling (directly or wetting fuel ahead of fire (foam on structure for protection)) it, smothering or removing it (digging fire line, blowing leaves).

We can also use topography or natural features to steer the fire or stop it (use of roads, streams, etc.). We have no control over weather so we always must monitor it to make sure no major changes will negatively affect our suppression efforts.

We will break them each down a bit further.

FUELS



- Fuel Loading
- Continuity or Arrangement
- Moisture Content
- Ground, Surface or Aerial Fuel
- Structures



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Fuel loading - how much is there? How much is ahead of where you are currently operating. What is burning? Light flashy fuels like grass (quick burn time) or heavier wood which will burn longer and release more energy. Heavier fuels take more water or time to extinguish.

Continuity or Arrangement - Is it uniform layout of fuel (grass field, soy field) or patchy (wooded area with shrubs and meadow)

Moisture content - fuels are classified as 1 hour are 0-1/4" diameter, 10 hour are 1/4-1" diameter, 100 hour-1-3" diameter, 1000 hour >3 " diameter. This is a measure of how long it takes the fuel moisture to change based on atmospheric conditions. If RH of air is lower then fuel moisture then the fuel is being dried out. If RH of air is higher then fuel moistures, the fuel is becoming wetter.

Ground - duff, roots and rotten buried logs-smoldering fires

Surface - grasses, shrubs, trees (up to 6 feet tall), forest floor litter (fallen leaves, needles, twigs, bark)

Aerial (or Crown) - Overstory trees and shrubs

Structures - houses or buildings made from natural material that will burn and complicate suppression efforts. Burning house puts off a lot of heat and will increase fire behavior in that immediate area. Referred to as Urban Interface when fighting wildfires.

WEATHER



- Wind
- Relative Humidity
- Temperature



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Around here weather is the main driver for fire conditions.

Wind is going to drive the rate of fire spread and the intensity of the flames. We always need to know what current wind conditions are and what they will be in the hours to come as we fight the fire. Windy conditions also dry out the fuels faster by carrying water molecules from the fuels.

Relative Humidity is a measure of water vapor in the atmosphere. Little or no precipitation for extended time periods can result in lower relative humidity which in turn leads to lower fuel moistures. Around here low rh are seasonal normally for fall and winter months

Higher temperatures can increase fire behavior, especially in the mid-afternoon. That is when the most intense radiant heat from the sun is being transferred to fuels. In our climate here, during the colder months we can get low relative humidity with high winds along with cold temperatures and still get active fire behavior.

FIRE WEATHER WATCH



- Surface relative humidity (RH) less than 30 % for Maryland
- Sustained surface wind of 20 MPH or greater
- 10-hour fuel moisture less than or equal to 8% for Maryland

Fire Weather Watch

A Fire Weather Watch is issued to alert fire officials and firefighters of potentially dangerous fire weather conditions **within the next 24 to 36 hours**. They are issued when the following three criteria are met. Issued by local NOAA office.

RED FLAG WARNING



- Surface relative humidity (RH) less than 30% for Maryland
- Sustained surface wind of 20 MPH or greater
- 10-hour fuel moisture less than or equal to 8% for MD

Red Flag Warning

A Red Flag Warning is issued to alert fire officials and firefighters of **potentially dangerous fire weather conditions within the next 12 to 24 hours**. They are issued when the following three criteria are met. Again issued by local regional NOAA office.

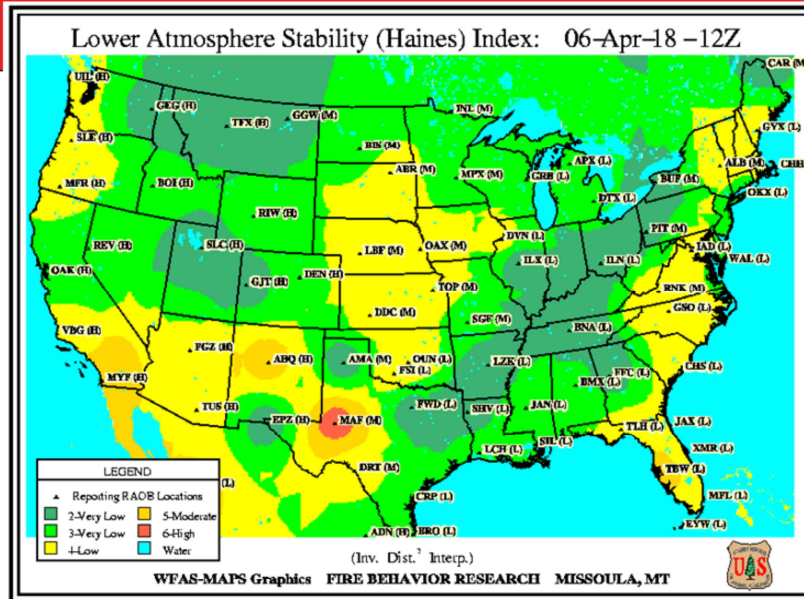
HAINES INDEX



- **Haines Index (also known as Lower Atmosphere Severity Index) is a weather index developed by meteorologist Donald Haines in 1988 that measures the potential for dry, unstable air to contribute to the development of large or erratic wildland fires.**
- **The index is derived from the stability (temperature difference between different levels of the atmosphere) and moisture content (dew point depression) of the lower atmosphere.**

What does this mean for you? It is available to check what is the potential for large fire growth in our region.

HAINES INDEX



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Haines Index on April 6, 2018. A Haines Index of 6 means a high potential for an existing fire to become large or exhibit erratic fire behavior, 5 means medium potential, 4 means low potential, and anything less than 4 means very low potential

TOPOGRAPHY



- Slope
- Aspect
- Shape
- Barriers



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Wildfires burn up a **slope** faster and more intensely than along flat ground and a steeper slope will result in a faster moving fire, with longer flame lengths-a chimney effect. Unlike humans, fires usually travel uphill much faster than downhill. The steeper the slope, the faster the fire travels. Fires travel in the direction of the ambient wind, which usually flows uphill. Additionally, the fire is able to preheat the fuel further up the hill because the smoke and heat are rising in that direction. Conversely, once the fire has reached the top of a hill, it must struggle to come back down because it is not able to preheat the downhill fuel as well as the uphill. Think about slope tactically.

Aspect is the direction that a slope faces. The direction a slope faces determines how much radiated heat it will receive from the sun. Slopes facing south to southwest will receive the most solar radiation. As a result, this slope is warmer than slopes facing a northerly direction. The warmer slope results in lower relative humidity, higher temperatures and more rapid loss of moisture. The fuel will tend to be dryer flashy type that ignites and burns readily. The period that fires will ignite and burn will also be longer on south-facing slopes. Fire behavior is most intense in the mid to late afternoon.

Shape - Canyons, saddles, chutes can make a chimney effect and increase fire spread. Not a huge factor in what we face.

Barriers are anything (natural or man-made) that can stop or slow down the spread of fire. Examples are: fields, roads, streams, lakes, swamps, rocky outcrops

SAFETY-LCES



L-Lookouts
C-Communications
E-Escape Routes
S-Safety Zones

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LCES was developed by Paul Gleason after being on Loop Fire in 1966 (12 firefighters died) and the Dude Fire in 1990 (six firefighters died). He studied wildland fatality fires to come up with the common themes to the tragedies.

He found that these four elements are critical to firefighter survival in the wildland environment. It is a standard in the wildland community.

LCES condenses the 10 Standard Firefighting Orders and 18 Watch Out Situations. A key concept - the LCES system is identified to each firefighter prior to when it must be used.

The nature of wildland fire suppression dictates continuously evaluating and, when necessary, re-vising LCES as time and fire growth progress

L-LOOKOUTS



- **Competent/Trusted Personnel**
- **Multiple If Needed**
- **Good Vantage/Safe Location**



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Lookouts (or scouts) *have experience to recognize potential threats.* These can be considered the same as Field Observers in Appendix B of the Incident Response Policy. Their job is to warn the crew as well as informing command.

Be decisive

Communicate clearly

Be in a position to see potential threats and the entire crew

Be in a safe location

The whole idea is when the objective hazard becomes a danger the lookout relays the information to the affected firefighters so they can reposition to the safety zone

C-COMMUNICATIONS



- On Same Talkgroup
- Location Of Crews
- Briefing To Arriving Resources



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Communications is the vehicle which delivers the message to the firefighters, alerting of the approaching hazard. Communications must be prompt and clear. Established LCES must be communicated to newly arriving resources. This is our escape routes and safety zones.

E-ESCAPE ROUTES



- **Two Ways Out**
- **Easy Path To Safety Zone**



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Escape Routes are the path the firefighter takes from their current locations, exposed to the danger, to an area free from danger. Notice that escape routes is used instead of escape route.

There always must be more than one escape route available to the firefighter. Must be easily traveled and lead away from the fire, directly to the safety zone

Establish new escape routes as the current ones effectiveness diminishes (you are moving away from them)

Establish trigger points as to when you take the Escape Route

Is the escape route adequate for a rapid retreat and is there any chance it could be cut off? (If driving back to the last safety zone, is backing necessary or is there the ability to turn around?-- Have we discussed the escape plan enough so we can quickly communicate and make our planned escape when conditions warrant?

S-SAFETY ZONES



- Area Of Refuge
- Close Enough
- Large Enough



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Locations of adequate refuge from advancing fire. Communicated to command personnel headed to Safety Zone.

We watch the fire go by as we regroup. Accountability

Large enough for all who might use them. The black is a good safety zone, already burned. Watch for fuels partially burned in the black, fire can come back through.

Located for effectiveness

Large enough for protection without a fire shelter.

INCIDENT RESPONSE

Upon Dispatch Obtain:

- Fire Location
- Best Access
- Values Threatened
- Person Reporting the Fire
- Current Fire Weather Forecast
- Landowner, if Available
- Fire Cause, if Available



Other jurisdiction(s) involved, Size (hard for public to determine) , Fuels involved (dry ag field, woods, etc.), Hazards (i.e.. power lines), Rate of spread (slow or fast)

INITIAL ATTACK



- Size Up
- Establish Command
- Based on Resources:
Holding Action,
Evacuations, or Aggressive
Initial Attack



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Size up - figure out where it is and what you have. Might have to leave apparatus and hike to it. Use flagging for other incoming units on entrance to fields or trail to hike in. Think about Escape Routes, Safety Zones.

Fuels and terrain - What are the fuels? Are they heavy timber types or light, flashy, grass types? Are the fuels sheltered from direct solar radiation due to aspect or cover? Is the terrain steep or gentle?

Weather - is the wind speed greater or less than the forecast? Is it from the same direction? Are there dust devils or gusty winds that would indicate erratic behavior? Is the humidity about what was forecast? Are there any indicator clouds or thunderstorms? You can order a spot weather forecast for your location.

Smoke column - check size, height, color, direction and shape.

The greater the height and size of the column the greater the fire intensity. A fractured (bent over by the wind) column indicates a wind driven fire. Wind-driven fires can pose serious threats to safety as the fire grows. Spotting can become long range creating new fires ahead of the main fire. However, direction and rate of spread is more predictable.

Holding Action - might be protecting a house until other resources arrive.

Evacuations - get people out of danger

Aggressive Initial Attack - extinguish or contain the fire with fireline construction.

INITIAL ATTACK



- **Direct Attack-** Related actions to cool, smother, starve, beat out or otherwise extinguish the flames. All control action directly against the fire edge.
- **Indirect Attack-** Control action conducted a variable distance from and usually parallel to the edge of a wildland fire in such a manner as to deprive the advancing fire of fuel and thereby halt its progress.

Direct Attack- flames lengths less then 4 feet



Fire growing left to right. Go over the parts, Importance of the anchor point, keep from getting flanked if wind direction changes.

FIRE LINE CONSTRUCTION



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Handtools - scrape to bare mineral soil.

FIRE LINE CONSTRUCTION



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Bulldozer from MD DNR.

FIRE LINE CONSTRUCTION



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FIRE LINE CONSTRUCTION

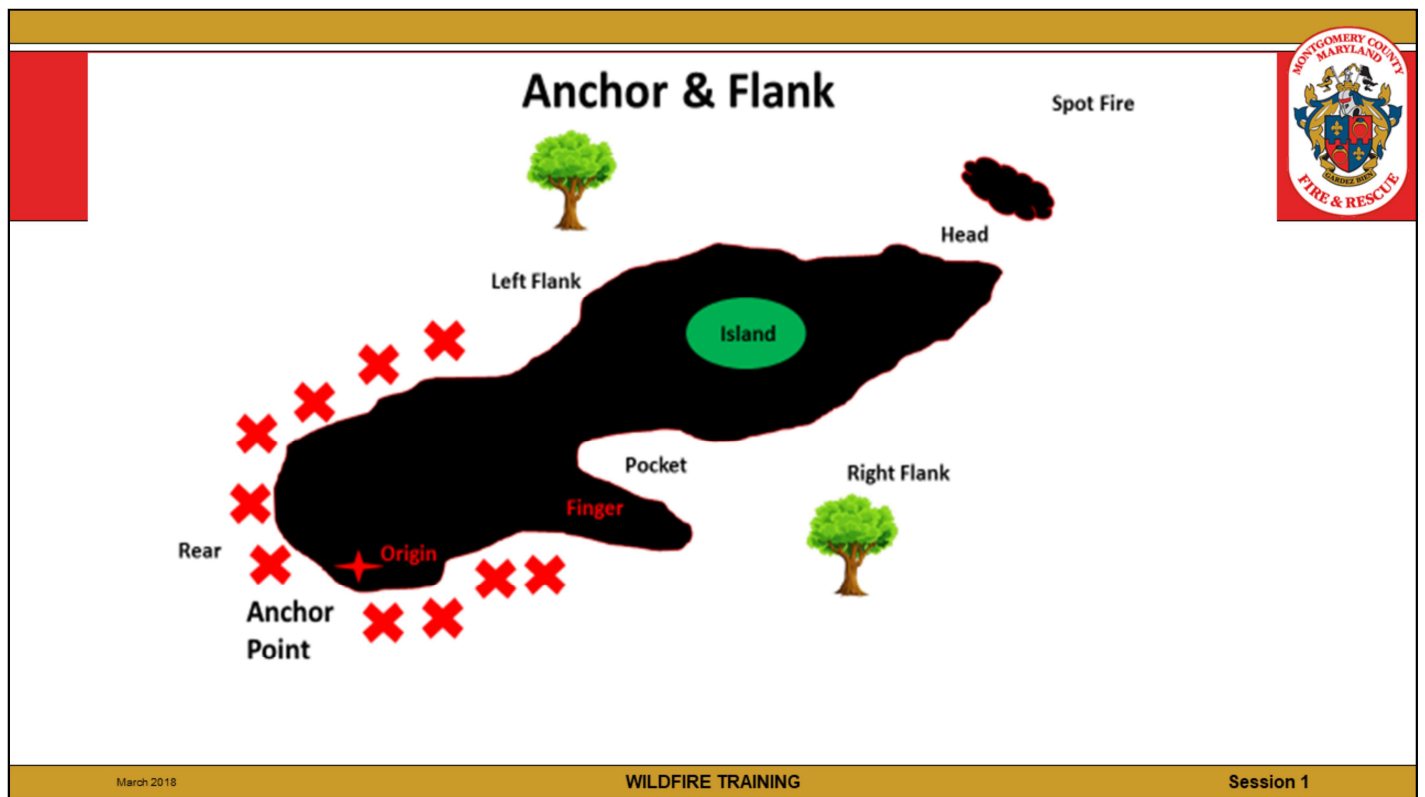


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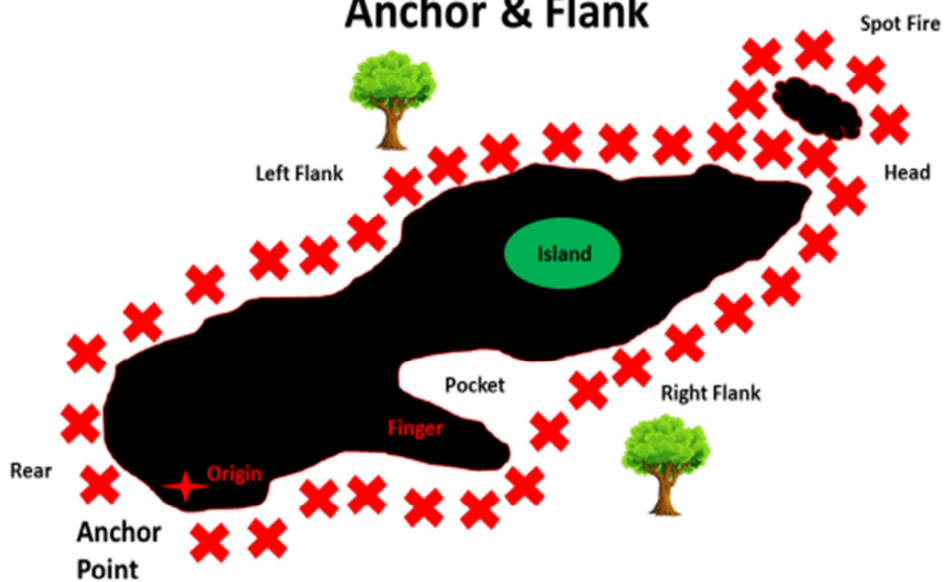
Hose line deployment.



We are going to work up both the left and right flank if resources allow. If limited, we chose the flank most threatening to structures or most active. The goal is to knock down the flaming front by using water or taking fuel away from the fire by digging line to bare mineral soil or using a back-pack blower to remove leaf litter, starving the fire of fuel.

Grass fire - drive engine in the black and advance from the anchor point. You are safe in the black.

Anchor & Flank



WILDLAND-URBAN INTERFACE



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With the rapid spread rates reached by wind-driven fires only two options are available. The traditional "anchor and flank" strategy or the protection of improvements and resources as the wildfire spreads past called Bump (or Pump) and Run.

Bump and Run dictates the necessity for a "defensible space" around each improvement sufficient to serve also as a safety zone, a true safety zone. Unless this precaution has been made the risk to defending the improvement may not be worth the operation.

Stay on the house until the fire passes and move to the next house. Have units go back to mop-up the burned through areas to prevent later ignition of structures.

BUMP AND RUN



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MOP UP

The process of making a controlled fire safe by extinguishing all remnants of fire within a specified strip adjacent to the control line. Many injuries and deaths occur during mop up. Stay Alert!



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On small fires, the entire burned area should be gone over.

On larger fires, a strip usually 100 feet wide and adjacent to the control line, should be made safe.

Water, class A Foam. You might need to spray it down, stir it up. In duff or trees, might be necessary to dig down to get to roots



SION - Firewise developed to help homeowners prepare for wildfires.

Clear leaves and other debris from gutters, eaves, porches and decks. This prevents embers from igniting your home.

Remove dead vegetation and other items from under your deck or porch, and within 10 feet of the house. Learn more about the basics of defensible space on the Firewise website.

Screen or box-in areas below patios and decks with wire mesh to prevent debris and combustible materials from accumulating.

Remove flammable materials (firewood stacks, propane tanks) within 30 feet of your home's foundation and outbuildings, including garages and sheds. If it can catch fire, don't let it touch your house, deck or porch. (could find yourself doing this to prepare a home for on-coming fire if time allows- if too much stuff, house might have to be written off)

Disaster plan

Use Fire resistant materials to build or upgrade the house, replace cedar shake roof with metal or tile.

See www.firewise.org for more info

Before coming to Montgomery County, Gary Cummings served with Larimer County Sheriff's Department, Fort Collins, CO- Yellow Jackets Wildland Fire Crew for five seasons.

He also was employed with the U.S. Fish and Wildlife Service- Red Rock Lakes National Wildlife Refuge, Lima, MT.

Gary has a bachelors degree from Colorado State University in Natural Resources Management, specializing in Wildland Fire



- End of Session